

**A Scoping Meeting for Water Quality Monitoring in Estuarine and
Nearshore Marine Waters in the National Park Service, Southeast
Coast Inventory and Monitoring Network.
Recommendations and Preliminary Timeline for Implementation**

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CONTRIBUTORS TO THE MEETING

Charleston, South Carolina

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Introduction and Purpose:

The goals of the Vital Signs Monitoring Program are to give Park Managers the tools to make appropriate decisions, and provide access to data legislatively required to be collected and maintained. In June, 2005, the Southeast Coast Network (SECN) held a Water Quality Monitoring Scoping Meeting in Charleston, South Carolina, for Estuary and Nearshore Marine Waters. The purpose of the meeting was to begin planning fundamental aspects of the SECN water quality monitoring program for estuarine and nearshore marine waters with the help of NPS staff and potential partners. From this meeting, several outcomes were expected:

- An understanding of the Southeast Coast Network and the direction of the SECN water quality monitoring program.
- Preliminary planning for our program.
- Information Product Descriptions (planning tools) for each of our monitoring objectives.
- Partnerships

This document describes the recommendations by meeting participants to address the SECN need for long-term monitoring of status and trends in our estuarine and nearshore marine waters.

Core Program Elements

Currently there are several successful on-going regional and national water quality monitoring programs. The take-away message heard loud and clear from this meeting was, “Don’t reinvent the wheel!” Suggestions were made to model our core program after two existing federal programs: A.) the National Estuarine Research Reserve (NERR) System fixed site monitoring and B.) The US Environmental Protection Agency’s (US EPA) probabilistic design (i.e. EMAP/NCA). Recommendations include information on essential vs. “nice to have” parameters as well as sample design and frequency. Recommendations were made based on parameters that give the greatest amount of information for long-term status and trends as well as cost.

A.) At each of our coastal parks with significant coastline area, a minimum of two targeted long-term fixed monitoring sites should be established for the assessment of temporal variability. Criteria for consideration when placing these sites include:

- Accessibility
- Park Manager desire
- Problem Areas (current or potential)
- Reference
- Habitat type

Decisions for the placement of these sites should ultimately be made by park managers with guidance from SECN staff. If there is a current or potential problem area in the park, this is where the primary site should be established. The

second site should then be a reference site in a less impacted area. For comparability, it is critical that this second site be located in a similar habitat type with similar conditions with respect to water depth, salinity, flow, etc... If there is a park with no significant problem areas, then sites should be placed in two different habitats for comparison.

At each site, a datalogger (e.g., YSI 6600) should be deployed. Instruments should be installed using methods developed by NERR. Instruments should be attached to a fixed piling and, where possible, be deployed at a standard 1m from bottom. Dataloggers should be programmed to take a reading every 30 minutes. Parameters to be measured include: Depth, Temperature, pH, DO, Salinity, and Turbidity. Although a Chlorophyll probe is available for these instruments, experience (of meeting participants) has shown that these data are neither accurate nor reliable. Every 10 – 14 days each datalogger should be retrieved and replaced with another calibrated datalogger. At this time it would be useful to also record site data such as the presence/absence of fish kills, algal blooms, marine mammal strandings, and marine debris. Data from each retrieved datalogger should be downloaded, and the instrument cleaned.

Additional samples should be taken monthly (standardized at low tide) at each of these fixed sites. Parameters include Total Dissolved Nitrogen (TDN), Total Dissolved Phosphorus (TDP), Chlorophyll *a* (Chl *a*), and Secchi depth. Quarterly, dissolved nutrients should be broken down by species. TDN and TDP were recommended rather than TN and TP primarily due to cost. It was suggested that if we see an increase of TDN or TDP over time, that may be a cue to examine the organic fraction. The group agreed unanimously that Chl *a* is an essential element to any monitoring program. Most said they would monitor Chl *a* even before monitoring nutrients because it provides more information. A comment was made that most states do not currently have a nutrient standard for estuarine waters, but many list for Chl *a*. Additional guidance was given with regards to laboratory analysis of both nutrient and Chl samples. We were cautioned to make sure that any lab we choose has EPA certification, and to include known (to us) unknowns as checks of performance. Laboratory specifications for contract bids are available to us from several agencies in order to make sure our verbiage is correct. If we were able to collect for bacteria and BOD on a monthly basis at each of these fixed sites, those data would be nice to have.

It was estimated that on an annual basis, cost for a park with two fixed sites should be around \$11K.

- B.) At each of our coastal parks with significant coastline area, we should also incorporate probabilistic sampling on a rotating basis in order to assess spatial variability. According to this group of experts, a complete survey of a park (30 stations) every 5(?) years is preferable to a study design that would collect 30 samples a handful at a time in each park over a five year period. This way, once every 5(?) years an assessment can be made for each individual park, and after a

full cycle, an assessment can be made on a network-wide level. Protocols for sample collection and analysis should follow those that have been established by the US EPA.

At each of these randomly selected sites, a standardized hydrographic profile should be taken for pH, DO, Temperature, and Salinity. A Secchi depth reading should be taken. Samples should be taken for TDN, TDP, Chl a, and sediments. One discussion debated the usefulness of sediments vs. fish tissue for toxics and contaminants in a long-term monitoring program. It was decided that since NPS will never find a common organism to use for tissue sampling, sediments are the only thing that could be used for a nationwide comparison. However, if there are red flags from sediment samples, SECN will recommend a fish tissue survey on a case-by-case basis. Another assurance comes from the fact that fish tissue monitoring is already being done at the State level, and these data are readily available to us. We were cautioned that data quality is extremely important in sediment sampling.

Partners/Cooperators for this project include US EPA, State Agencies already involved with annual NCA sampling, and NEP. Cost per park for sample analysis was estimated at \$40K. This estimate does not include labor and equipment.

Pathogens

A discussion was had regarding the monitoring of pathogens in our park waters. It is understood that pathogens are measured by State Health Departments. For any of our parks that are used for swimming or shellfish harvesting, SECN should survey what data are already being collected. If it is determined that sample location and/or frequency are not adequate for park needs, SECN should work with State Agencies to increase sampling efforts. In some cases SECN may recommend a special source tracking study.

Other Sampling

At each of our coastal parks with minimal coastline area, fixed sampling sites should be established. These stations will be set up on a park-by-park basis. Parameters measured should be based on management needs as well as fulfill State reporting requirements.

SECN Next Steps:

After this scoping meeting SECN staff prepared a rough timeline for the implementation of this monitoring program. Target dates for projects are as follows:

- Summer 2005 – Establish one YSI datalogger station at each of our four National Seashores (Cape Hatteras, Cape Lookout, Canaveral, and Cumberland Island) in order to pilot this project. We were told that NERR threw away 1 full year of data when they started their monitoring, therefore SECN would like to take this

opportunity to work out the details of training staff, data management, etc... before we are expected to report on our monitoring data.

- Summer 2005 – GPS verification of GIS coverage and water body locations.
- Fall 2005 – Draft of protocol written for fixed site datalogger (YSI) monitoring.
- March 2006 – Protocol development summaries completed for estuarine/nearshore marine water quality monitoring.
- Summer 2006 – Pilot our first NCA-like sampling event (CANA?).
- Summer 2006 – Pilot our first monthly nutrient/Chl/Secchi site.
- 2006 – Scoping for smaller park fixed site sampling.
- 2007 – Implement smaller park fixed site sampling.
- 2007 (?) – Add 2nd datalogger to each park and establish monthly monitoring at each of those sites.
- Summer 2007 – NCA-like sampling at next park.
- 2007 - Scoping for Pathogen sampling in parks.
- 2008 – Implement any additional pathogen sampling needed at the parks.

*****For further information on any of the above mentioned topics, please contact Eva DiDonato (eva_didonato@contractor.nps.gov) or 843-883-5036.*****

Supporting Documentation:

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